

# APPARATUS AND METHOD FOR CAPTURING A DOCUMENT

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The invention relates to an image-capturing apparatus and method, and more particularly relates to an image-capturing system and method with compression technologies.

### 2. Description of the Prior Art

Most computer systems use a form of raster image to output image data to a visual output device such as a cathode ray tube (CRT) monitor, liquid crystal display (LCD), or a printer such as a color laser copier. A raster image is represented as a series of scan lines of pixels, wherein each pixel is accessed in a sequential manner, and each scan line is processed. An area to which image data may be output sequentially by the visual output device is referred to as a page. The image data of a page provides its complete visual representation.

Interpreters of page description languages typically process images in one or both of two modes: band mode and frame mode. Both of these however generally require a buffer memory which can

hold the entire visual representation of a page, it is desirable to reduce the buffer memory requirements, for example by using some form of compression. In general apparatus of image-capture, such as a scanner, there are two models in a technology of compression.

5 "Loss-less" is one that image data captured by the scanner is decompressed without distortion, while "Lossy" is one that the image data is distorted after decompression. One compression method is shown in U.S. Pat. No. 6,269,190 to Mikkelsen et al. related to processes and apparatus for processing image data. A page of an  
10 image is divided into several regions. Each of these regions may be compressed according to a different technique according to the kind of data within the region. Each region can be compressed with a method that works well for the data contained in that region.

15 Another compression method is shown in U.S. Pat. No. 6,097,845 to Ng et al. It is for discriminating among image characteristics in order to select among a plurality of compression techniques. Multiple compression schemes are applied to a source image concurrently and the results are stored. Image discrimination is  
20 performed in parallel with the image compression to generate a recommendation regarding the stored compressed images.

## **SUMMARY OF THE INVENTION**

25 It is a principal object of the present invention to provide a

system and method of image capture. Users can determine a captured image coordinated with settings of various compression models. Thus, the capture rate speeds up as well as the captured image isn't distorted.

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It is another object of the present invention to provide a method of scanning applied on a scanner. A scanned object can be divided into various zones with various compression ratios set by users.

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In the present invention, an apparatus for capturing a document with a plurality of compression models comprises an image-processing system and an image-capturing system. The image-processing system is for accepting a request of setting the compression models for the document and processing the data of the document according to the compression models, wherein the request is from an exterior electric device connected to the apparatus. The image-capturing system is for capturing the data of the document, and is connected to the image-processing system and comprises multitudes of optic devices. The method for capturing the document with these compression models comprises accepting a request of setting the compression models for the document; capturing the data of the document; and processing the data of the document with these compression models.

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## **BRIEF DESCRIPTION OF THE DRAWINGS**

A better understanding of the invention may be derived by  
5 reading the following detailed description with reference to the  
accompanying drawings wherein :

FIG. 1 is a block diagram of an image-capturing system 11 for  
practicing the present invention; and

FIG. 2 is a schematic diagram illustrating the flow chart in  
accordance with the present invention.

## **DESCRIPTION OF THE PREFERRED EMBODIMENT**

While the invention is described in terms of a single preferred  
embodiment, those skilled in the art will recognize that many devices  
described below can be altered as well as other substitutions with  
20 same function and can be freely made without departing from the spirit  
and scope of the invention.

Furthermore, the drawings are not necessarily to scale for  
clarify of illustration and should not be interpreted in a limiting sense.

25 Furthermore, the present invention can be applied on other  
image-capturing apparatus without limitation of a scanner in the

present invention.

In the present invention, a capturing system for capturing a document with a plurality of compression models comprises computer-readable programs, an processing system, and a scanning system. The computer-readable programs are stored in a computer connected to said capturing system and used for providing a display interface for assigning the compression models to the zones on the document. The processing system is for accepting a request of setting the compression models for the document and processing the data of the document according to the compression models. The request is from the computer-readable programs. The scanning system is connected to the processing system and used for capturing the data of the document and transferring the data to the processing system. The method for capturing the document with these compression models comprises accepting a request of setting the compression models for the document; capturing the data of the document; and processing the data of the document with these compression models.

Referring now to FIG. 1, there is shown a block diagram of an image-capturing system for practicing the present invention. The image-capturing system 11 may be implemented as functional components within a scanning system, and may take the form of hardware or software, or some combination thereof. In one

embodiment, the components of FIG. 1 may be implemented in any hardware platform suitable for a scanning system. For example, there are a data capture part 12 and a data process part 14 in the image-capturing system 11. The data capture part 12, such as optical  
5 devices and the related peripheral apparatus or circuits, is responsible to capture the raw data of a document 10 when the document 10 is scanned by the image-capturing system 11. The document 10 is typically a paper document containing a source image of some kind. The source image may be primarily grayscale, such as a photograph, or  
10 primarily bitonal, such as text. Alternatively, the source image is a more complex image type incorporating both grayscale and bitonal components.

In such cases, the data process part 14, such as microprocessor  
15 and related peripheral devices and circuits, is responsible for processing the raw data and executing various types of compression for the raw data. For example, color compression may be used, in which case an analysis of chrominance and luminance components might be performed in order to provide recommendations among various color  
20 and non-color compression schemes. Next, the data process part 14 outputs the processed image data to a host computer 16 for further data processing.

In one embodiment of the present invention, the data process

part 14 can provides users to select various compression models, such as “Loss-less” and “Lossy”, for a single document 10 through the host computer 16. For example, users can select “Loss-less” compression model for the source image of the document 10 on consideration of non-distortion. The “Loss-less” compression model processes the image data with the lower ratio of compression, which doesn’t result in distortion through decompression by the host computer 16. On the other hand, users select “Lossy” compression model for the other inferior parts of the document 10 on consideration of the less capacity of data. The “Lossy” compression model processes the image data with the higher ratio of compression, which may reduce the capacity of the image data and speed up the scanning process.

FIG. 2 is a schematic diagram illustrating the flow chart in accordance with the present invention. First, pre-scanning of a document is performed by the scanner with default settings (step 20) in order to perform classification of the document. Users can view the pre-scanned image on a display screen with any image software in the host computer. Next, users would select a scanned zone for the document they want through the tools provided by the image software (step 22). As one of key features of the present invention, users can further determine one or more “Loss-less” zones and “Lossy” zones on the selected scanned zone (step 24). In the present invention, the geometric shapes of the “Loss-less” or “Lossy” zones can be arbitrary, dependent on the users and the tools provided by the image software.

Then the formal scanning of the document is implemented by the scanner according to the users' settings through the host computer (step 26).

5           While this invention has been described with reference to illustrative embodiments, this description is not intended to be construed in a limiting sense. Various modifications and combinations of the illustrative embodiments, as well as other embodiments of the invention, will be apparent to persons skilled in the art upon reference to the description. It is therefore intended that  
10           the appended claims encompass any such modifications or embodiments.